

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed September 29, 2008. In the Office Action, objections were made to the specification, figures, claims, and abstract. The objections have been addressed herein. In addition, claims 1-9 were preliminarily rejected as allegedly being unpatentable. Claims 7 and 8 have been amended and claim 10 has been cancelled without prejudice. Claims 1-9 are presently pending in the present patent application.

RESPONSE TO HEADINGS REQUEST

In the Office Action, headings were requested to identify different portions of the application. In response, the Applicant has added headings to the pending application.

RESPONSE TO ABSTRACT REQUEST

In the Office Action, the Abstract was objected to due to the Abstract not commencing on a separate sheet. In response, the Abstract has been provided in the present response on a separate sheet.

RESPONSE TO DRAWING OBJECTIONS

In the Office Action FIGS. 4, 6, and 8 have been objected to for various reasons. These FIGS. have been amended to address the same and submitted as replacement sheets.

RESPONSE TO CLAIM OBJECTIONS

In the Office Action claims 7 and 8 were objected to for certain informalities. Claims 7 and 8 have been amended accordingly to address the objections.

RESPONSE TO CLAIM REJECTION UNDER 35 USC §112

In the Office Action, claim 10 was preliminarily rejected under 35 USC §112, second paragraph, as allegedly failing adequately point out the subject matter of the claimed invention. Claim 10 has been cancelled without prejudice.

RESPONSE TO CLAIM REJECTIONS BASED ON OBVIOUSNESS

In the Office Action, claims 1-9 have been preliminarily rejected under 35 USC §103(a) as allegedly being unpatentable over US Patent 6,236,733 to Kato et al. (hereafter, "Kato"), in view of Japanese Patent No. 60171897A to Maruno (hereafter, "Maruno"). It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of references must disclose, teach, or suggest, either implicitly or explicitly, all elements/features/steps of the claim at issue. See, e.g., In re Dow Chemical, 5 U.S.P.Q. 2d 1529, 1531 (Fed. Cir. 1988), and In re Keller, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981).

Claim 1

Independent claim 1 reads:

1. A loudspeaker provided with a frame (101), a membrane (103) and a drive unit (105), the membrane having an outer circumferential edge suspended from the frame and an inner circumferential edge, the drive unit having a stationary part secured to the frame and a translatable part secured to the inner circumferential edge of the membrane, wherein the membrane includes a membrane body (104) which, viewed in a circumferential direction, has a pattern of folds (104c) radially extending between the inner circumferential edge and the outer circumferential edge of the membrane, which folds, viewed from the membrane body towards the driving unit in a direction substantially perpendicular to the membrane, have a depth (d) which increases from said edges towards an area (104A) situated between the inner circumferential edge and the outer circumferential edge, in which area the folds are provided with faces (104C), wherein a suspension means is provided which is secured to the frame and said faces.

The Applicant respectfully submits that neither Kato, nor Maruno, disclose, teach, or suggest all elements of independent claim 1. The present invention is concerned with a loudspeaker in which the membrane is a conical body that provides an outer circumferential edge (to be suspended from a frame) and an inner circumferential edge (to be secured to a translatable part of a drive unit). As discussed on page 1 of the specification, a conical membrane should have a certain minimal stiffness in order to be able to move like a piston for low-frequency reproduction. Also, the membrane should have a controlled behavior at and above the first break up of the membrane for mid and high frequency reproduction. Difficulties may arise in cases where a shallow speaker is required.

The present invention is concerned with providing a loudspeaker that may be constructed to have a small height without detriment to its sound performance. With this in mind, the present invention provides a loudspeaker that employs a membrane which, viewed in a circumferential direction, has a pattern of folds radially extending between its inner circumferential edge and its outer circumferential edge, which folds, viewed from the membrane body towards the driving

unit in a direction substantially perpendicular to the membrane, have a depth that increases from the edges towards an area situated between the inner circumferential edge and the outer circumferential edge, in which area the folds are provided with faces. In the loudspeaker a suspension means is provided, which is secured to the frame and the aforementioned faces of the membrane body.

An example membrane is illustrated in Figure 4. As explained on lines 4 to 20 on page 5 of the specification, the membrane 103 has a flat membrane body 104 provided with a flat outer circumferential edge 104a and flat inner circumferential edge 104b. The membrane is provided with a pattern of radial folds 104c, which pattern extends over the surface of the membrane 104, viewed in a circumferential direction. The folds 104c have a depth (d) which increases from the outer edge 104a towards a middle area 104A formed by a ring-shaped zone between the edges 104a and 104b, and from the inner edge 104b towards this area 104A, whereby the maximum depth (d) is located in the area 104A. Folds 104c are provided with faces 104C in the area 104A.

As noted at page 5, lines 24 to 27, the membrane 104 is connected to the frame 101 by way of a suspension means (e.g. spider 111) which is secured to the frame 101 and the faces 104C of the folds 104c. The use of faces 104C to secure the spider to the membrane body facilitates the attachment of the spider to the membrane body because a bigger surface is available to accept glue. This means that the tolerances in parts of machinery becomes less critical and the larger surface available permits a stronger connection between the membrane body and the spider. Furthermore, the use of areas in which the folds are provided with faces enables the use of various alternative constructions. For example, it permits the construction with a spider that connects the membrane to a stationary part of the magnet system (as illustrated

in present Figure 2), and also the alternative in which the spider connects the membrane to the outer part of the frame (as illustrated in Figure 1). As a further alternative, the faces of the membrane may be secured to both of the stationary part of the magnet system and the outer frame of the loudspeaker (both illustrated in Figure 3).

In some applications the use of only an inner spider may be preferred as less material is required resulting in cost reductions. In other applications the use of an inner or outer spider assists to lower the fundamental resonance of the cone body compared with the spider that extends between the inner and outer periphery of the frame.

Thus, the construction of the membrane in the present loudspeaker results in enhanced versatility; various techniques may be employed for securing the suspension means to the frame and the membrane in accordance with the present invention.

The loudspeakers disclosed in the prior art documents differ from the loudspeaker presently claimed. Kato does not provide folds with faces for securing to the suspension means. Rather, in Kato the diaphragm is folded to provide an "annular ridge" (see claim 1 of Kato), which is "fixed to the damper at a position between the inner and outer peripheries thereof". Thus, Kato has a cone body with a sharp annular ridge that has to fit in between the peripheries of the spider. This is illustrated as ridge 8a in, for example, Figure 3 of Kato. As explained in column 5, lines 21 to 29, the ridge 8a is attached in a recess 10a of the damper 10 by adhesive 20.

The use of a sharp annular ridge for securing the membrane to the suspension means provides manufacturing difficulties. Also, it limits the application to use only a spider that extends between the inner and outer periphery of the frame of the loudspeaker. This is consistent

with claim 1 of Kato, which states "wherein a damper is attached to the magnetic circuit at an inner periphery and to the frame at an outer periphery thereof".

It should also be noted that the presently claimed invention of independent claim 1 also differs from that disclosed in Maruno. In this Japanese document there are no faces between the folds; rather, the folds of Maruno are next to each other and have only sharp ridges between them. This can be seen clearly from Figure 2, which shows a ridge line 1a, a valley line 1b, and apex 1c. Therefore, Maruno does not provide a face for securing the membrane body to the suspension means.

As a result of at least the abovementioned, a combination of Kato and Maruno cannot result in the presently claimed invention. Both prior documents propose the provision of sharp folds in the membrane body. Neither document suggests the provision of faces on the membrane for facilitating attachment of a suspension means to the membrane. Indeed, Maruno does not show a practical way to connect a suspension means to the membrane body.

In summary, the Applicant respectfully requests allowance of independent claim 1.

Claims 2-9

Since independent claim 1 is allowable over the prior art of record, its dependent claims 2-9 are allowable as a matter of law. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). Additionally and notwithstanding the foregoing, these dependent claims recite further features and/or combinations of features (as is apparent by examination of the claims themselves) that are patentably distinct from the prior art of record. Hence, there are other reasons why these dependent claims are allowable.

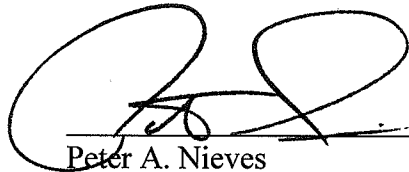
Application No.: 10/567,400
Attorney Docket No.: 18244-6101

CONCLUSION

In light of the foregoing and for at least the reasons set forth above, the Applicant respectfully requests favorable reconsideration and allowance of the present application and the presently pending claims. If in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (603) 627-8134.

Respectfully submitted,

SHEEHAN, PHINNEY, BASS + GREEN, P.A.

A handwritten signature in black ink, appearing to be "Peter A. Nieves", is written over a horizontal line.

Peter A. Nieves
Attorney for Applicant
Reg. No.: 48,173

Customer No.: 57449
SHEEHAN PHINNEY BASS + GREEN, P.A.
1000 ELM STREET
MANCHESTER, NH 03101 U.S.A.
TEL: 603.668-0300
FAX: 603.627.8121